

HINTS ON SMALLPOX AND ITS ANTIDOTE.

ADDRESSED TO THE
OPPONENTS OF REVACCINATION

BY

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IN a tract for the times, it would be easy to blow a medical trumpet, and by stirring appeals endeavour to arouse the apathetic, or frighten the refractory into duty. We prefer, in a calm and simple way, to state a few facts and general principles, such as all heads of families ought to know in the present crisis.

Smallpox arises from the reception into the system of a subtle poison. After catching the infection, the usual course of the disease is this:—There are first twelve days of incubation, during which the patient feels comparatively well, and the poison is being hatched or matured in the blood. Then fever suddenly sets in, which continues of a smart character for two days, or until the eruption begins to show itself. In the early stage of the incubation period only can the poison, once imbibed, be met and overpowered.

Why, as a general rule, persons are susceptible of this disease only once in a lifetime, is involved in mystery. Apparently two things are essential for its production:—(1.) The poison; (2.) Some principle in the blood, coalescing with this poison, which one attack either wholly or partially exhausts. As if a farmer were to sow some seeds in a particular soil, rich in some ingredient requisite for their germination. The first crop might so exhaust this ingredient that subsequent sowings would be in vain. But there is this difference between the cases. Whereas in the earthy soil the requisite principle could never grow again of its own accord, the soil of the human blood seems to have the power of reproducing it to some extent, so that in the lapse of years the seed of Smallpox virus may again take root.

About a hundred years ago Dr. Jenner discovered that this principle in the blood could in great measure be exhausted by a much milder poison than that of Smallpox, viz. that of Cowpox or Vaccinia. The occasion was this. At a time when Smallpox produced great ravages in our own and other lands,

and while Jenner was still an apprentice to a Surgeon in Sodbury, a notion prevailed among the peasantry, that the Milkmaids employed in the dairies of Gloucestershire, who were constantly getting a kind of pock on their hands from the udders of the cows, escaped the Smallpox. Catching hold of this popular notion, he investigated into its truth, found it to be correct, and at length conceived the grand idea, that as this Cowpox could be communicated to man at pleasure, why not from one person to another, so as to grant to all and sundry the same immunity from this terrible scourge as these same milkmaids had so long enjoyed. Fully aware of the vastness of the boon he was conferring on the world, if his ideas stood the test of experience, Jenner did not rush rashly into print the moment the grand thought occurred to him, but investigated the matter for nearly thirty years, till in 1798 he published to the world that "masterpiece of medical induction," his immortal work announcing his discovery.

Jenner himself never believed that Vaccination would be a certain preventive of Smallpox in all individuals and under all circumstances, but that it would confer the same immunity, neither more nor less, that a previous attack of smallpox does; in fact that the Cowpox virus is just the Smallpox virus modified by transmission through the Cow; and that Vaccination, thoroughly done so as to infect the blood, was virtually a mild attack of Smallpox. The identity of the two poisons has, since his day, been sufficiently established by direct experiment. Cows have frequently been inoculated with the lymph of Smallpox from the human subject, ordinary Cowpox has been produced, and from the resulting vesicles a supply of lymph abstracted for vaccination purposes. In 1830 again, Dr. Sonderland, of Barmen, brought on ordinary Cowpox on cows, not by inoculation, but by enveloping them in blankets taken from the bed of a Smallpox patient; and the lymph taken from these cows produced genuine vaccine vesicles in the human

subject. So then in the nature of things, since the two poisons are originally identical, Vaccination must have great influence both in modifying and preventing Smallpox. But to prove this by overwhelming evidence is beside our point. Why prove that to be a blessing which, whether a blessing or no, the Law compels us to impart to all our children? Revaccination, however, is a different matter. This being optional, our sequel shall chiefly be devoted to show the propriety of its general adoption.

REASON I. Because the records of our various Smallpox Hospitals abundantly show, that multitudes have been so vaccinated in infancy as to leave little or no permanent trace behind; and that these imperfect vaccinations are no adequate protection against the disease. A scratch on the arm, with lymph inserted into it, does not always produce Vaccinia, the constitutional disease, but sometimes a mere local irritation, such as any scratch with any acrid stuff applied to it might occasion. The vaccine vesicle has specific characters well defined, and leaves on healing a very distinct and peculiar scar. A good scar or cicatrix is whitish in colour, depressed below the level of the skin, has well defined edges, and is pitted or dotted over its surface. A bad cicatrix, showing that the vaccination has been imperfect, or that its influence is passing away, is level with the surface, smooth instead of pitted, and with such ill-defined edges that one cannot easily trace its outline. Now for any one with such ill-defined scars, or none at all, to rest content with the notion that he has been vaccinated in infancy and therefore safe, is simply to repose in a false security which a sad awakening may any day dispel. Dr. Marson, of the London Smallpox Hospital, gives one instructive Table of Twenty years statistics.* He found the deaths of the unvaccinated to average 37 per cent; or fully one third of those attacked. In those who stated that they had been vaccinated, *but whose vaccination had left no scars behind*, the death rate was 23 per cent. With one scar only, though sometimes of a very indifferent quality, the death rate was 7 per cent. With two scars, good or bad, it was 4 per cent. With three scars the death rate was fully 1 per cent. And with four or more scars only $\frac{1}{2}$ per cent; *i. e.*, one death only out of every two hundred cases. When this table is further analysed, so as to retain those having good scars only, the result is still more satisfactory and instructive; the practical inference from the whole being, *that the efficiency of vaccination, as a modifying and protecting power, is in exact ratio to the number and quality of the scars left*

as its result. Our first reason then for Revaccination in adult age, is the absence or imperfection of many of the scars produced in infancy.

REASON II. Because even when efficiently done in infancy, does not the lapse of time, with the constitution constantly undergoing changes, cause its protective influence gradually to die away? Jenner's anticipations, we fear, that one vaccination was equal to an attack of Smallpox, have not been realized. For the Smallpox virus seems to be the poison in its full strength. Passing through the Cow it becomes much milder, but still so strong that few medical men choose to vaccinate direct from the cow, when matter can be obtained from a healthy child. This cow lymph therefore, humanized by passing through a child, may only be lymph of the *third* degree of strength; as finally this same baby lymph, passing through an adult that has been vaccinated before, produces a vesicle, the lymph of which is so deteriorated that for protective purposes it is considered worthless. Surely then it stands to reason, that if the protective influence of the stronger poison may wear itself out, more readily must the milder poison do so, and require repetition within a shorter time.

REASON III. Because experience abundantly confirms these views. The present Epidemic, whatever else may issue from it, has taught us this important lesson, that in Revaccination, on an extensive scale, lies the chief safeguard of the people. Take Edinburgh and Dalkeith as examples. An eminent Edinburgh Doctor lately informed me, that after due inquiry at the Smallpox Hospital and other sources, he felt certain that no person had died there of this epidemic, who had been efficiently revaccinated; though possibly a rare case of a mild character may occasionally have occurred. The "Scotsman," usually well-informed before committing itself to any statement of facts, corroborates this. In its weekly article "Health of the City" for March 4, 1872, it says: "We understand that close observation of the Smallpox Epidemic continues to bear out the statement which has been repeatedly made, that no person properly revaccinated has died of the disease, if indeed any such have caught the infection." As to Dalkeith, where the disease prevailed very virulently, and where Revaccination had at first to encounter much prejudice and opposition, till sad experience taught the people wisdom, my friend Dr. Thomson writes me, (Apr. 17, 1872) that in some instances he had to vaccinate too late, when Smallpox was already in the system, and the two diseases ran their course together. But allowing the vaccination to be in time, or ten days

* In quoting from this Table we purposely avoid fractions. See Dr. Marson's Essay on Smallpox in Reynolds' System of Medicine.

to elapse after the insertion of the lymph, he had seen "only four or five mild cases" to follow, but not one case of death, out of "several hundreds" thus revaccinated, many of them in houses where Smallpox was. He adds, "My experience leads me now not only to advise revaccination to prevent Smallpox, but also to advise vaccination to be practised in the case of persons just affected with it, *i. e.*, just as soon as the malady can be made out. Revaccination is evidently a much greater protection than a former attack of Smallpox itself."

Equally definite and emphatic is the testimony of Dr. Marson of the London Hospital, a gentleman who from his large experience, and painstaking character both as an observer and recorder of facts, may justly be regarded as the highest authority on Smallpox in our country. During his long Physicianship he had seen only a "very few" cases in persons who said that they had been properly revaccinated, and all these had the disease in a "very mild form." Again, all nurses and servants on coming to live at the Hospital Dr. M. made a point of revaccinating, unless they had had Smallpox already; with the astonishing result that, though frequently inhaling the poison in its intensest form, no nurse or servant has taken Smallpox during their residence there for the last thirty years! One fact like this is far more telling than tables of statistics. We add another. A few years ago, some extensive repairs in this same Hospital required the employment of a large number of workmen for several months together. On the recommendation of Dr. M. these workmen all protected themselves by revaccination, except a very few who objected. During these months only *two* workmen caught the infection, these being selected from the refractory few who set at nought the Doctor's counsel.

Lest any one should think, however, that death from Smallpox, after revaccination, is a thing unknown, I may refer to the statistics of the gallant Prussian Army. According to Dr. Simon, the deaths from Smallpox used to average 104 per annum. But on revaccination becoming systematically adopted, the deaths have been reduced to 2 per annum, or forty in all during twenty years. Yet many of these revaccinations must have been imperfect; for on analysing these forty cases "it appeared that only four were in persons who were said to have been *successfully* revaccinated." (Simon on Vacc., pp 35-6.) So then one death every five years, among such a huge multitude of troops, seems the average death-rate after *successful* revaccination!

If such be a specimen (and but a meagre specimen) of what can be said in favour of vaccination, can nothing be said on the other side? O yes, numerous objections are often urged against it, which we cannot but regard as frivolous and unfounded.

OBJECTION I. *Some degree of danger attends the operation.* ANSWER. No doubt of it, if the patient be in bad health at the time. In certain bad habits of body, even a scratch from a thorn bush may take on Erysipelas of an alarming character. Still a healthy person, receiving such a scratch dozens and dozens of times, does not usually fall into hysterics at the bare possibility of such an issue. During my own long practice I must have vaccinated many thousand persons, and though I have occasionally seen an arm a little sorer than one would like, I have never seen anything approaching to danger, or heard of such a thing in the practice of the other Biggar Doctors.

OBJECTION II. *We see in children that when bad matter is used, it sometimes brings out skin eruptions.* ANS. Such skin eruptions, rarely occurring, result from *good* matter rather than *bad*, and the better and more active the lymph the more likely are they to follow. The explanation is this. A child whose humours are not quite pure has a ready tendency to skin eruptions, as nature's safety valve to prevent something worse going on within. But this tendency may not develop itself till some constitutional irritation be set up, such for example as accompanies teething. Now this is what vaccination does. It sets up a degree of constitutional irritation, and calls to the surface what was lurking in the blood before. Query. Is it not far better out than in?

OBJECTION III. *But think of the danger of being vaccinated from consumptive, scrofulous, or even syphilitic children, and thereby getting a taint communicated to the system.* ANSWER. Were a medical man to vaccinate from such children, his conduct is worthy of the highest reprobation, and contrary to all the rules imposed upon us by our medical guides. Still if through inadvertence such a thing should happen, the danger is not so great as many suppose. For, the lymph being pure or unmixed with blood, what is vaccination? It is communicating to the system a morbid poison, through the medium of the *Skin*, instead of in the ordinary way through the *Lungs*. Why should any taint be more likely to be imparted in the one way than the other? or why should Vaccinia communicate anything but itself, more readily than Measles, or Hooping Cough, or Scarlatina? To be unduly nervous on this point therefore is almost to equal the silly mother who should exclaim, "Dear me, how unfortunate! My child has just passed through an attack of Measles, having caught the infection from Baby Brown; and though now quite recovered and in perfect health, I have learned to my horror that Brown had once a sister threatened with decline!"

Some striking facts confirm the groundlessness of this alarm. When a person is vaccinated success-

fully while incubating Smallpox, he may become the subject of Cowpox and Smallpox existing together. Now in *hundreds of instances* children have been vaccinated from the vaccine vesicle of such a patient, with the result of communicating Cowpox only, not Cowpox and Smallpox combined; showing that vaccine lymph can impart its own particular virus only, and not any other virus with which, in the same patient, it may be conjoined.

Again, the Germans we all know are a heroic sort of people; as daring apparently in medicine as in war. One reckless *Savant* had the audacity to vaccinate healthy children with vaccine lymph taken deliberately and on purpose from children affected with worse than Scrofula. Several French Physicians have done the same. And though in our country such experiments would justly be considered execrable and atrocious, still since some people are so unscrupulous as to try them, it is interesting to know as the result, that in no instance could taint be communicated in that way. According to Dr. E. Cator Seaton, (on whose authority I quote these experiments), it was found no more possible to produce such taint by the pure vaccine lymph of such a constitutionally diseased child, than it is to produce Smallpox by vaccine lymph taken from the arms of patients who are incubating Smallpox, or suffering from it. (Seaton on Vaccination.)

OBJECTION IV. *I am veritably informed that when the two poisons meet it is certain death.* ANSWER. Whoever informed you so knows nothing of the matter. When the two poisons meet the one tends to modify and neutralize the other, and that poison will gain the mastery which first arrives at the stage of maturity. After imbibing Smallpox virus, fortunately there are twelve days of incubation before the primary fever sets in; whereas Cowpox runs its course more rapidly, and by the eighth or ninth day has gained such maturity as to afford protection. There are thus three or four clear days, after catching the infection of Smallpox, during which the antidote can be applied with effect. Suppose for example a person catching the infection on a Monday. If vaccinated successfully before the ensuing Thursday, the Vaccine virus would gain the mastery, and destroy the Smallpox virus in the

blood. If after Thursday, the Smallpox virus would master the Vaccine, perhaps arrest its progress, and run its course. But even in such a case many medical men think it would not run its course quite so virulently. Dr. Furley of Edinburgh, for example, vaccinates in all stages, and apparently with the best effect. He seems to act on the principle that when two rogues quarrel an honest man is likely to get his own; or when the two poisons meet at any stage, that they spend their strength in combating one another, and allow the Constitution to escape unharmed.

PRACTICAL CONCLUSIONS.

I. That in the primary vaccination of infants, two vesicles (unless the child be very delicate) are better than one.

II. Though the scars from primary vaccination continue good, revaccination is a measure of prudence on approaching the age of manhood or womanhood.

III. If the scars of the primary vaccination have become indistinct or disappeared, this revaccination is not only prudent, but urgently required.

IV. That this should be gone about deliberately in healthy seasons, to give medical men ample time to select their lymph, rather than in seasons of panic, when the rush for vaccination strongly tempts them to use any kind of lymph that comes in their way.

V. That on the outbreak of an Epidemic every one should have the condition of his vaccine scars examined, and act accordingly.

VI. When any member of a family becomes attacked, all the household should *at once* be vaccinated, except such as from previous Smallpox, or from the number and perfection of their vaccine scars, appear sufficiently protected.

BIGGAR, 23RD. APRIL, 1872.

